

Dissociation, Hardiness, and Performance in Military Cadets Participating in Survival Training

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The present study examined the relationship between peritraumatic dissociation, hardiness, and military performance in Norwegian Navy officer cadets ($N = 80$) after a simulated prisoner of war (POW) exercise. The cadets reported symptoms of peritraumatic amnesia, depersonalization, and derealization in response to a mild stress experience (time point 1) and exhibited a significant increase in such symptoms when subsequently exposed to a highly stressful experience of being placed in a mock POW camp (time point 2). Symptoms of peritraumatic dissociation were significantly and negatively related to performance, and predicted between 16 and 26% of the variance between subjects. A subscale of the personality hardiness measure (i.e., the subdimension of challenge) was negatively associated with peritraumatic dissociation in response to both the mild stress situation and the more stressful POW exercise in study subjects. Hardiness was not significantly associated with military performance scores. The present data indicate that individual differences in attribution style and in a propensity to dissociate significantly affect military performance during exposure to high stress situations.

Introduction

Studies of civilian populations have provided evidence that psychological symptoms of dissociation frequently occur among trauma victims.¹⁻³ These symptoms, which are often referred to as symptoms of "peritraumatic dissociation," have also been thought by a number of clinicians and investigators to be associated with an increased risk for the subsequent development of post-traumatic stress disorder (PTSD).⁴⁻⁷

Until recently, much of the supporting data about the link between peritraumatic symptoms of dissociation and the subsequent development of PTSD has been largely retrospective in nature, which has limited our understanding about the actual frequency and intensity of such symptoms in healthy and clinical populations. Recent retrospective and prospective investigations of healthy subjects exposed to highly stressful events has provided evidence that symptoms of dissociation are common in law enforcement officers involved in critical shooting incidents⁸ and in military personnel exposed to the acute stress of survival training.⁹⁻¹¹ The data from these recent studies suggest that under extremely stressful events all individuals may experience symptoms of dissociation. In the studies of U.S. military personnel exposed to survival training Morgan et al.^{9,11} found that dissociation was negatively related to performance. Furthermore, a previous history of traumatic stress exposure

has also been associated with acute stress reactions and how much dissociation one experienced during stress.^{9,12} Although the previous studies have demonstrated that dissociation symptoms may be relatively common and somewhat related to one's history of trauma, little is known about the degree to which personality dimensions such as hardiness might be related to symptoms of peritraumatic dissociation.

Personality hardiness is a personality trait or cognitive style marked by increased levels of commitment, control, and challenge,¹³ which has been associated with good health and high performance under a variety of stressful conditions in both civilian and military samples.¹⁴⁻¹⁶ Personality hardiness has been found to serve as a moderator between combat exposure and PTSD.¹⁷ It has been proposed that individuals higher in personality hardiness tend to believe that they can control or influence events and that they have a commitment to activities and their interpersonal relationships and to self, in that they recognize their own distinctive values, goals, and priorities in life. People higher in hardiness also tend to interpret stressful events in positive and constructive ways, and construe such events as a challenge and valuable learning opportunity.¹⁸ If hardiness encourages individuals to interpret stressful events in positive terms, then hardiness might well lead to increased resilience and adaptability in a highly stressful situation such as survival training. However, the relationship between personality hardiness and stress-induced symptoms of dissociation has not been fully explored.

Thus, the present study was designed to examine the relationship between stress-induced symptoms of dissociation and personality hardiness in healthy subjects. Furthermore, the present study was also designed to explore whether dissociation and hardiness would be significantly related to military performance during exposure to survival training stress. In this study, we had several *a priori* hypotheses that were based on the findings of our previous investigations: 1) that exposure to acute stress of the prisoner of war (POW) camp experience would elicit symptoms of dissociation; 2) that there would be a negative relationship between symptoms of dissociation and performance; and 3) that personal hardiness would be associated with fewer symptoms of dissociation.

Methods

Participants

As part of their 3-year officer development program, all first-year cadets at the Royal Norwegian Naval Academy participate in a week-long training exercise and in a field simulation exercise. The participants in the present study consisted of all members of the 2001/02 cohort of Navy officer cadets ($N = 80$). Thirty-four (43%) of the cadets belonged to the operational

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branch, 14 (17%) to the technical branch, and 30 (40%) to the logistics branch. Although the exercise itself was mandatory, participation in the research study was not. Seventy-six (95%) of 80 recruited cadets agreed to participate at one or the other of the time points, and 56 cadets (70%) completed the questionnaires at both assessment time points. Mean age for the group of cadets who responded at both assessment time points was 24.80 years ($SD = 3.87$; range, 20–41 years); furthermore, 91% ($n = 73$) cadets were male and 9% ($n = 7$) were female. All participants had a minimum of 1 year of military service before entering the Royal Norwegian Naval Academy, and they were screened by the same criteria for health and mental aptitude before admission.

Procedure

To prepare for their annual field exercise, the Norwegian Navy cadets are exposed to a variety of military procedures and survival skills. At time point 1, subjects were exposed to an educational program and a personal experience with some typical aspects of a POW situation (such as being detained in a prison camp, being blindfolded, and going through a brief registration procedure). In this teaching setting, the cadets are also introduced very briefly (5–10 minutes) to a simulated interrogation session. This training and demonstration lasted for approximately 5 hours, in which the cadets also received feedback on their own verbal and nonverbal behavior from experienced instructors in survival tactics. In the experience of the academy training, this exposure to "mild stress" has proven to be a very cost-effective way of increasing the cadet's adaptive behavior and performance when later placed in the more rigorous POW stress experience during their field exercise some weeks later.¹⁹

Four weeks after the time point 1 exposure to "mild stress," the cadets were exposed to an intensive 1-week field exercise designed to give them an opportunity to demonstrate and develop small unit leadership skills while undergoing challenging and stressful situations. This field exercise phase included a simulated sustained operation, with cadets performing various military tasks, (naval operations and field training). Cadets were given a minimum of food and obtained little sleep during the exercise. The cadets operated in squad-size units of about seven to nine persons. The leader role was rotated within the group until all cadets had been exposed to at least one period of approximately 16 to 18 hours as a squad leader. After each period, leader behavior and performance were assessed and evaluated by the team members before a new cadet was assigned to take over the team leader role. These performance appraisals and feedback sessions were carried out in the field setting and were facilitated by a coach from the Naval Academy staff. In this way each cadet observes and reflects on the leader behavior of fellow cadets, in addition to receiving feedback on his/her own performance as team leader. Approximately 3 to 4 days into this 1-week exercise, the cadets experienced a "high stress" component, which consisted of a very realistic 24-hour POW simulation. During this experience, the cadets experienced the shock of capture, were blindfolded during movement, experienced lack of food, lack of sleep, and confinement in a prison yard. During this confinement, the cadets also experienced interrogation stress-intense questioning by trained interrogators. Previous research has confirmed that this phase of training is a highly stressful experience for Norwegian officer cadets.²⁰

Assessment Schedule

To obtain a measure of "peritraumatic dissociation" in response to "mild" and "highly intense" stress, subjects were administered a valid reliable self-report instrument (Clinician-administered Dissociative States Scale [CADSS]) at two time points: time point 1 and time point 2. The time point 1 assessment with the CADSS occurred when the cadets were in the classroom setting at the Academy 1 day after they had completed the pretraining ("mild stress") exercise. At time point 2, the CADSS measure was administered within 2 hours after the cadets had finished the survival element of the 1-week leadership exercise.

To obtain a measure of the personality construct of hardiness, cadets were administered the Hardiness Scale at time point 1 one day after they had completed the pretraining ("mild stress") exercise and after they had also completed the CADSS.

Independent expert raters assessed the performance of the cadets in the mock POW experience ("high stress" component). The expert raters were trained interrogators from the Norwegian school of military intelligence. After each session the expert interrogators rated cadet performance (see below for details). Performance ratings were coded, and to ensure the privacy of the cadets, individual performance ratings were not available to the Academy staff.

Measurement Instruments

The CADSS is a reliable and valid self-report instrument designed to assess state symptoms of dissociation in response to a specific stressor.²¹ A Norwegian version of the CADSS was used in the present study. The scale includes 19 self-report items and 8 observer-rated (clinician-rated) items. Subjects rated the intensity of the dissociation symptoms on a scale from 0 (not present) to 4 (extreme). The scores for individual items were summed to produce the total score and three subscales measuring amnesia, depersonalization, and derealization. Subjects were instructed to respond to the scale items by using the pretraining (first measurement) and the POW situation (second measurement) as the reference point. Because of the design and nature of the training exercises, it was not possible to obtain expert observer ratings of the CADSS. Thus, only the subjective items were rated. This same procedure has also been applied in previous studies.⁹ In the present sample ($n = 72$), the Cronbach α for the total CADSS scale was 0.73, and for the subscales of amnesia, depersonalization, and derealization were 0.39, 0.70, and 0.66, respectively.

Personality hardiness was measured with a Norwegian translation of the short form (15-item)²² of the Dispositional Resilience Scale reported by Bartone.²³ This scale has shown good reliability and validity across a wide range of samples.¹⁸ In the present sample ($n = 72$), the Cronbach's α s for the total scale was 0.73 and for the subscales of commitment, challenge, and control were 0.43, 0.82, and 0.51, respectively. In a group of U.S. Army cadets, the 3-week test-retest reliability for this measure was 0.74 (P.T. Bartone, unpublished data).

Trained military interrogators from the Norwegian school of military intelligence were used as independent expert raters. The expert raters (age 25–40 years) were blind to the data collected in this study and to the purpose of the research project. Before the cadets were taken as POWs, they were briefed about

a "classified mission" about to take place in the next 24 hours. In the POW situation, cadets were exposed to a minimum of three interrogation sessions with at least two different interrogators. The aim of the interrogators was to extract as much information about the "classified mission" and the unit as possible. The interrogators rated cadet performance (range, 0 = doing poorly to 5 = doing very well) on the following two dimensions after each session: 1) verbal performance assessed whether the cadets adhered to standard military procedures of only communicating name, rank, and military number or if they also talked to the interrogator about the "classified mission" and 2) nonverbal performance assessed whether the cadets were able to keep a neutral posture and controlled body language or if they were influenced to reveal "classified information" by nonverbal behavior such as pointing to a map, nodding or shaking their head, writing information, or making a drawing on a sheet of paper, etc. This procedure produced an independent rating of average verbal, nonverbal, and total performance for each cadet in the POW situation.

Design and Statistics

The design of this study was such that at time point 1 (after exposure to a mild stress) subjects provided a measure of dissociation and a measure of hardiness. At time point 2, subjects provided a report of symptoms of dissociation in response to the "high stress" mock POW experience. In addition, performance scores from the mock POW phase were also encoded. Pearson correlation analyses were used to assess whether at time point 1 the variables "dissociation" and "hardiness" were related to one another. Pearson product moment correlations were also used to detect whether there was a significant association in the report of symptoms of dissociation at time point 1 with symptoms of dissociation at time point 2, and between hardiness (time point 1) and dissociation at time point two. Furthermore, a repeated measure 2 (group: "low versus high personality hardiness") \times 2 (situation: low versus high stress) factorial design was used. The first factor was treated as a between-group factor (low versus high personality hardiness) and the second factor (low versus high stress) as a within-group factor. Multiple comparisons were followed up by Tukey honestly significant difference tests. Pearson's correlations were used to examine the relationship between personality hardiness (including subdimensions) and peritraumatic dissociation symptoms.

Finally, stepwise regression analyses were performed using dissociation symptoms in the mild stress situation (CADSS scores time point 1) as predictor variables and expert assessment of verbal performance and nonverbal performance in the POW situation as outcome measures. The independent variables were allowed to enter the equation if they fulfilled the inclusion criterion ($p < 0.05$).

Results

Dissociation Symptoms

Total mean CADSS scores were mean = 13.84 (SD = 6.79) after the mild stress (time 1) and mean = 22.28 (SD = 12.84) after exposure to the high stress situation (time 2). There was an overall increase in reported dissociative symptoms from time point 1 to time point 2 ($t(57) = 5.67, p < 0.001$). As shown in

Tables I and II, there was a significant increase in all CADSS subdimensions (amnesia, depersonalization, and derealization) from the mild stress situation to the POW exercise (all $p < 0.001$). Comparisons of dissociation scale items by paired sample t tests revealed a significant increase in 11 of 19 items (items 1-7, 10-12, and 14) from the mild stress to the high stress situation. The most common symptoms of dissociation in the mild stress situation were related to amnesia and derealization (e.g., item 15, spaced out or lost track of what was going on; item 16, sounds almost disappeared or became stronger than you would have expected; and item 17, things seemed very real, as if there were a special sense of clarity). In the high stress situation (POW exercise), the most common symptoms of dissociation were also related to amnesia and derealization (e.g., item 2, things seemed unreal, as if in a dream; item 14, things happened that you were unable to account for later; and item 15, spaced out or lost track of what was going on). See Table I for further details.

Pearson correlations were examined to evaluate the relative stability in individual levels of dissociative symptoms from the mild stress to the high stress situation. Cadets with a high load of dissociation symptoms at time 1 also revealed relatively higher levels of dissociation symptoms at time 2. This was found for the CADSS total score $r(58) = 0.37, p < 0.01$, the derealization dimension $r(58) = 0.34, p < 0.01$, and the amnesia dimension $r(58) = 0.28, p < 0.05$. However, no significant correlations were found for the CADSS depersonalization dimension $r(58) = 0.24$, not significant.

Personality Hardiness

The Navy cadets revealed an average personality hardiness score of 30.46 (SD = 4.19). Mean scores on the personality hardiness subdimensions of commitment, challenge, and control were 11.36 (SD = 1.48), 8.98 (SD = 2.92), and 10.12 (SD = 1.47), respectively. All intercorrelations between the total hardiness score and the subdimensions of personality hardiness were positive, $r(72) \geq 0.62, p < 0.001$. Furthermore, the subdimensions of commitment and control were positively correlated $r(72) = 0.50, p < 0.001$.

Relationship between Personality Hardiness and Symptoms of Dissociation

The personality hardiness total score was negatively associated with dissociative symptoms ($r = -0.36, p < 0.01$), derealization symptoms in the mild stress situation ($r = -0.36, p < 0.01$), and with derealization symptoms in the high stress situation ($r = -0.30, p < 0.05$). Furthermore, the personality hardiness dimension of challenge was negatively associated with dissociative symptoms ($r = -0.42, p < 0.001$) and derealization symptoms ($r = -0.44, p < 0.001$) in the mild stress situation. The personality hardiness subdimension of challenge was also negatively related to dissociation symptoms ($r = -0.29, p < 0.05$) and derealization symptoms in the high stress situation ($r = -0.35, p < 0.01$).

To examine group differences in symptoms of dissociation between subjects with high or low (median split) levels of personality hardiness, a series of repeated measures analysis of variance were performed with dissociation symptoms as the outcome variable. The results indicated that there was a main

TABLE I
SEVERITY OF INDIVIDUAL STATE DISSOCIATIVE SYMPTOMS AFTER THE MILD STRESS SITUATION (TIME 1)
AND THE POW EXERCISE (TIME 2) IN HEALTHY NORWEGIAN NAVY OFFICER CADETS

CADSS ^a	Navy cadets reporting presence of symptom ^b		Symptom severity Navy cadets (N = 58)		Statistics ^c			
	n	%	Mean	SD	r	t	df	p
1. Things seem to move in slow motion								
Time 1	26	45	0.69	0.90				
Time 2	40	69	1.34	1.19	0.15	3.64	57	<0.001
2. Things seemed unreal, as if in a dream								
Time 1	31	53	0.60	0.64				
Time 2	53	91	1.88	1.08	-0.05	7.58	57	<0.001
3. You had a feeling of separation								
Time 1	21	36	0.57	0.92				
Time 2	37	64	1.07	1.04	0.16	2.99	57	<0.01
4. You felt as if you were watching things from outside your body								
Time 1	19	33	0.57	0.92				
Time 2	30	52	1.07	1.04	0.19	2.30	57	<0.05
5. You felt as if you were watching the situation as an observer or spectator								
Time 1	12	21	0.31	0.68				
Time 2	27	47	0.69	0.90	0.22	2.87	57	<0.01
6. You felt disconnected from your body								
Time 1	14	24	0.29	0.56				
Time 2	26	45	0.76	1.05	0.16	3.15	57	<0.01
7. Your sense of your own body seemed changed								
Time 1	32	55	0.67	0.74				
Time 2	46	79	1.43	1.11	0.13	4.63	57	<0.001
8. People seemed motionless, dead, or mechanical								
Time 1	28	48	0.74	0.93				
Time 2	26	45	0.72	0.97	0.21	0.11	57	NS
9. Objects looked different than you would have expected								
Time 1	34	59	1.22	1.27				
Time 2	33	57	1.26	1.40	0.25*	0.16	57	NS
10. Colors seemed diminished in intensity								
Time 1	26	45	0.69	0.90				
Time 2	40	69	1.38	1.17	0.21	4.00	57	<0.001
11. You saw things as if in a tunnel or through a wide angle photographic lens								
Time 1	13	22	0.31	0.68				
Time 2	29	50	0.76	0.94	0.06	3.15	57	<0.01
12. Things seemed to take much longer than you would have expected								
Time 1	21	36	0.52	0.80				
Time 2	48	83	1.95	1.15	0.20	8.66	57	<0.001
13. Things seemed to happen very quickly, as if there were a lifetime in a moment								
Time 1	38	65	1.22	1.14				
Time 2	31	53	0.90	1.02	0.05	1.67	57	NS
14. Things happened that you were unable to account for later								
Time 1	22	38	0.53	0.80				
Time 2	51	88	1.71	1.12	0.10	6.80	57	<0.001

TABLE 1 CONTINUED

CADSS ^a	Navy cadets reporting presence of symptom ^b		Symptom severity Navy cadets (N = 58)		Statistics ^c			
	n	%	Mean	SD	r	t	df	p
15. You spaced out or lost track of what was going on								
Time 1	44	76	1.36	1.17				
Time 2	50	86	1.62	1.12	0.24	1.40	57	NS
16. Sounds almost disappeared or became stronger than you would have expected								
Time 1	44	76	1.64	1.25				
Time 2	42	72	1.33	1.11	0.19	1.56	57	NS
17. Things seemed very real, as if there were a special sense of clarity								
Time 1	41	71	1.09	0.88				
Time 2	44	76	0.83	1.01	0.21	1.42	57	NS
18. You felt as if you were looking at the world through a fog								
Time 1	25	43	0.57	0.77				
Time 2	29	50	0.83	1.01	0.08	1.61	57	NS
19. Colors seemed much brighter than you would have expected								
Time 1	12	21	0.24	0.54				
Time 2	15	26	0.36	0.69	0.18	1.15	57	NS
CADSS amnesia score								
Time 1			1.90	1.56				
Time 2			3.29	2.11	0.28*	4.85	57	<0.001
CADSS depersonalization score								
Time 1			2.36	2.54				
Time 2			4.92	4.19	0.24	4.40	57	<0.001
CADSS derealization score								
Time 1			9.57	5.12				
Time 2			14.07	7.99	0.34**	4.78	57	<0.001
CADSS total score								
Time 1			13.84	6.79				
Time 2			22.28	12.84	0.37**	5.67	57	<0.001

*, $p < 0.05$; **, $p < 0.01$.

^a Intensity of dissociative experiences rated on a scale from 0, not present, to 4, extreme. Scores for individual items were summed to produce the subscales and total score.

^b Cadets reporting slightly or more presence of dissociative symptoms (i.e., scores ≥ 1).

^c Relative symptom stability (r) and comparison of mean scores from time 1 to time 2 by paired comparison t test and two-tailed significance tests.

effect of the factor group (high/low personality hardiness; $F_{1,54} = 4.25$, $p < 0.05$). Follow-up tests showed that cadets in the low hardiness group reported significantly more symptoms of dissociation compared to the cadets classified as high in personality hardiness ($p < 0.05$). Furthermore, there was a main effect of stress exposure ($F_{1,54} = 30.56$, $p < 0.001$). Examination of individual cases revealed that 18% ($n = 9$) of the cadets revealed less dissociation symptoms and 82% ($n = 46$) of the cadets showed an equal amount or more dissociation symptoms after the POW exercise compared to the mild stress situation. Follow-up separate analysis with repeated measures analyses of variance were performed using the three facets of hardiness (commitment, control, and challenge) as the fixed factor and using CADSS scores as the dependent variable. The analyses indicated there was a main effect on the group. Post hoc analysis revealed that this was due to the fact that symptoms of dissociation were significantly related to the "challenge" subdimen-

sion of the hardiness measure ($F_{1,54} = 4.25$, $p < 0.05$). This was caused by lower levels of dissociation symptoms in cadets scoring high on the challenge subdimension. No significant main effects were obtained for the commitment and control dimensions, except a main effect of stress exposure ($F_{1,54} \geq 28.75$, $p < 0.001$), with cadets revealing fewer dissociation symptoms at the mild stress situation and more dissociation symptoms after the live exercise.

Military Performance

Independent assessments by the expert raters showed higher levels of verbal performance (mean = 4.41; SD = 0.69) compared to nonverbal performance (mean = 4.14; SD = 0.77) in the POW situation ($t(72) = 3.32$, $p < 0.001$). The independent expert raters assessment of verbal performance was positively correlated with their assessment of nonverbal performance ($r = 0.84$, $p < 0.001$). No significant relationships were found among mea-

TABLE II

FORWARD STEPWISE REGRESSION ANALYSIS OF CADSS ITEMS REFLECTING TIME 2 (HIGH STRESS) AND OUTCOME MEASURES OF MILITARY PERFORMANCE

Outcome Measures	Model	R	R ²	CADSS Item(s)	B	β	t
1. Independent rating of verbal performance	$F_{2,70} = 12.55^{***}$	0.51	0.26	5, watching as an observer	-0.48	-0.66	-5.01***
2. Independent rating of nonverbal performance	$F_{2,70} = 8.02^{**}$	0.43	0.19	4, watching from outside	0.26	0.40	3.04**
				5, watching as an observer	-0.35	-0.43	-3.83***
				8, people seemed motionless	0.21	0.25	2.22*

*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

asures of personality hardiness, total CADSS scores in the mild stress or high stress situation, and the military performance measures.

Stepwise linear regression analyses with CADSS symptom scores taken after the mild stress situation as dependant variables and independent expert ratings of verbal and nonverbal performance as the dependent variable produced no significant models. However, analyses using the CADSS symptom scores taken after exposure to the high stress situation produced a significant model ($F_{2,70} = 12.55$, $p < 0.001$), where two dissociation symptoms explained 26% of the overall variance in military performance. These items were the CADSS item 5 ("feeling like watching the situation as an observer or a spectator;" $\beta = -0.66$, $p < 0.001$) explaining 17% of the variance and item 4 ("feeling as if you were watching things from outside your body;" $\beta = 0.40$, $p < 0.01$) explaining an additional 9% of the variance in verbal performance in the POW situation.

In the next series of stepwise regression analysis, independent expert ratings of nonverbal performance was entered as the dependent variable with the same CADSS items from the high stress situation as the independent variables. The model was significant ($F_{2,70} = 8.02$, $p < 0.01$). Two items from the high stress situation explained 19% of the variance in military performance. These items were the CADSS item 5 ("feeling like watching the situation as an observer or a spectator;" $\beta = -0.43$, $p < 0.001$) explaining 13% of the variance and item 8 ("people seemed motionless, dead or mechanical;" $\beta = 0.25$, $p < 0.05$) explaining an additional 6% of the variance in the nonverbal performance in the POW situation.

Discussion

Consistent with previous studies of healthy subjects participating in survival school training, exposure to stress resulted in a significant increase in symptoms of dissociation in nearly everyone.⁹ Furthermore, individuals who reported more symptoms of dissociation after the relatively mild stress at time point 1 reported more symptoms of dissociation at time point 2, suggesting that individuals who are more prone to experiencing symptoms of dissociation in response to a mild stress may be more likely to exhibit a greater number of such symptoms as the level of stress exposure increases. Finally, the present study, which was conducted in a separate country from our previous studies in U.S. military personnel, provides additional evidence that despite the fact that stress-induced symptoms of dissociation are commonly experienced by healthy individuals, such symptoms are not necessarily adaptive—as evidenced by the

fact that the cadets who exhibited greater symptoms of dissociation did not perform as well as their peers who were not dissociators.

The present data extend the results of previous prospective investigations of dissociation in healthy subjects and suggest personality characteristics (the factor of personality hardiness and particularly the subdimension of challenge) are significantly and negatively associated with peritraumatic dissociation. This finding (that persons reporting a greater sense of being able to meet challenge experienced less dissociation) is compatible with previous research data, indicating that personality hardiness may have a direct or "buffering effect" on life stress.¹⁵ In a stress environment, such as the simulated POW situation, an individual has very little control and few if any possibilities to escape. An individual who has a greater sense of self-confidence in his or her ability to deal with novel and changing situations (that is challenge) might have a greater capacity to cope with the stress of detainment and manage anxiety and stress. A greater sense of control might also decrease an individual's level of arousal and cortisol—both of which have been linked to symptoms of dissociation.¹¹

High hardy individuals might also be more efficient in eliciting emotional support and help from their fellow peers and detainees in the same situation and benefit from an increased sense of security and, thus, fewer symptoms of dissociation. In a previous study, Bartone et al.²⁴ found that the personality factor of hardiness significantly contributed to increased cohesion in military teams after intensive training experiences, including being exposed to a simulated POW experience. Although the hardiness measure did not predict military performance, it was significantly related to the propensity for a cadet to experience symptoms of dissociation. Thus, this measure (or other measures designed to assess this dimension of personality) may be useful in helping to identify which cadets may be more likely to experience symptoms of dissociation when exposed to highly stressful events, and who, as a result, may be at risk for greater operational task impairment.

Specific symptoms on the CADSS depersonalization and de-realization (from the time point 2 assessment) explained a significant amount of variance in military performance of subjects while in the POW situation. This could point to possible dysfunctional coping strategies in the high stress situation. It seems individuals who are experiencing dissociation are less able to exhibit intact problem solving abilities during their exposure to interrogation stress. At this point, it is not clear whether symptoms of dissociation distract the subject from attending to his/her interaction with the interrogator or whether

such symptoms reflect a decrease in functioning of brain areas responsible for higher order cognitive operations. Although recent studies have begun to elucidate and implicate specific brain areas and cell receptor sites in the generation of symptoms of dissociation, our current understanding of the neurobiology of dissociation is in its infancy.²⁵ At present, the specific etiology of the specific symptoms is unknown. Future research designed to examine specific symptoms of dissociation with regard to neural systems involved in glutamate turnover in response to stressful stimuli may assist in increasing our understanding of this question in greater detail.

Taken together, the present study replicates earlier studies and confirms that although acute stress may result in symptoms of dissociation in nearly anyone, some individuals are more prone to dissociate than others. The present study also extends the extant literature by showing that specific symptoms of dissociation are negatively related to performance. Given the clearly articulated nature of the tasks, the cadet is confronted with during interrogation stress, an awareness of the components of the dissociation that are most strongly related to performance deficits may help us understand the neurobiology of cognitive performance during stress. Finally, the present study extends previously published data by showing an association between the personality dimension of hardiness and stress-induced symptoms of dissociation. The subdimension of challenge was negatively related to dissociation, and this may reflect (as may the CADSS) a sense of personal vulnerability or lack of mastery, etc. Because this personality dimension is identifiable and can be assessed in individuals before their exposure to stress, tests such as this might be useful when trying to identify individuals who may be more prone to dissociate when exposed to conditions of high stress conditions. Furthermore, and because individual differences in a propensity to dissociate during stress were linked to military performance, an assessment of propensity to dissociation in military applicants may provide a way of identifying those who may be at risk for difficulty during high stress. The present data represent a first step toward an increased understanding of the factors that contribute to stress hardiness and stress vulnerability in military personnel. Clearly, the issue is complex and more research is needed.

References

1. Bremner JD, Brett E: Trauma related dissociative states and long term psychopathology in posttraumatic stress disorder. *J Trauma Stress* 1997; 10: 37-50.
2. Cardena E, Spiegel D: Dissociative reactions in the bay area earthquake. *Am J Psychiatry* 1993; 150: 474-8.
3. Classen C, Koopman C, Hales R, Spiegel D: Acute stress disorder as a predictor of posttraumatic stress symptoms. *Am J Psychiatry* 1998; 155: 620-4.
4. Bremner JD, Krystal JH, Putnam FW, Southwick SM, Marmar C, Charney DS, Mazure CM: Measurement of dissociative states with the Clinician-Administered Dissociative States Scale (CADSS). *J Trauma Stress* 1988; 11: 125-36.
5. Carlson EB, Rosser-Hogan R: Trauma experiences, posttraumatic stress, dissociation, and depression in Cambodian refugees. *Am J Psychiatry* 1991; 148: 1548-51.
6. Holen A: The North Sea oilrig disaster. In: *International Handbook of Traumatic Stress Syndromes*, pp 471-8. Edited by Wilson JP, Raphael B. New York, Plenum Press, 1993.
7. Koopman C, Classen C, Spiegel D: Predictors of posttraumatic stress symptoms among survivors of the Oakland/Berkeley, California firestorm. *Am J Psychiatry* 1994; 151: 888-94.
8. Rivard MJ, Dietz P, Martell D, Widawski M: Acute dissociative responses in law enforcement officers involved in critical shooting incidents: the clinical and forensic implications. *J Forensic Sci* 2002; 47: 1093-1100.
9. Morgan CA III, Hazlett G, Wang S, Richardson G, Schnurr P, Southwick SM: Symptoms of dissociation in humans experiencing acute uncontrollable stress: a prospective investigation. *Am J Psychiatry* 2001; 158: 1239-47.
10. Morgan CA III, Wang S, Hazlett G, Rasmussen A, Anderson G, Charney DS: Relationships among cortisol, catecholamines, neuropeptide Y and human performance during uncontrollable stress. *Psychosom Med* 2001; 63: 412-42.
11. Morgan CA III, Rasmussen A, Wang S, Hauger R, Hazlett G: Neuropeptide-Y, cortisol and subjective distress in humans exposed to acute stress: replication and extension of a previous report. *Biol Psychiatry* 2002; 52: 136-42.
12. Eid J, Johnsen BH: Submarine accidents—acute stress reactions in submarine crewmembers. *Milit Med* 2002; 167: 427-31.
13. Maddi SR, Kobasa SC: *The Hardy Executive*. Homewood, IL, Jones-Irwin, 1984.
14. Bartone PT, Ursano RJ, Wright KM, Ingraham LH: The impact of a military air disaster on the health of assistance workers: a prospective study. *J Nerv Ment Dis* 1989; 177: 317-28.
15. Beasley M, Thompson T, Davidson J: Resilience in response to life stress: the effects of coping style and cognitive hardiness. *Pers Indiv Diff* 2003; 34: 77-95.
16. Kobasa SC: Stressful life events, personality and health: an inquiry into hardiness. *J Pers Soc Psychol* 1979; 37: 1-11.
17. Taft CT, Stern AS, King LA, King DW: Modeling physical health and functional health status: the role of combat exposure, posttraumatic stress disorder, and personal resource attributes. *J Trauma Stress* 1999; 12: 3-23.
18. Bartone PT: Hardiness as a resiliency factor for United States forces in the Gulf War. In: *Posttraumatic Stress Intervention: Challenges, Issues, and Perspectives*, pp 115-33. Edited by Violanti JM, Paton D, Dunning C. Springfield, IL, Charles C Thomas, 2000.
19. Laberg JC, Eid J, Johnsen BH, Eriksen BS, Zachariassen KK: Coping with interrogations. In: *The Human in Command: Exploring Issues in Military Social Science*, pp 333-4. Edited by McCann C, Pigeau R. New York, Kluwer Academic Publishers, 2000.
20. Eid J, Brun W, Laberg JC, Johnsen BH: Participating in a Prisoner-of-War Exercise: Stress Reactions and Coping. Paper presented at the 34th International Applied Military Psychology Symposium, May 25-28, 1998, Paris, France.
21. Bremner JD, Krystal JH, Putnam FW, et al: Measurement of dissociative states with the Clinician-Administered Dissociative States Scale (CADSS). *J Trauma Stress* 1998; 11: 125-36.
22. Bartone PT: A Short Hardiness Scale. Paper presented at the Annual Convention of the American Psychological Society, June 30-July 3, 1995, New York, NY.
23. Bartone PT: Predictors of stress-related illness in city bus drivers. *J Occup Med* 1989; 31: 657-63.
24. Bartone PT: Test-retest reliability of a short hardiness scale. Unpublished manuscript, Dept. of Behavioral Sciences and Leadership, U.S. Military Academy 1998; West Point, NY.
25. Bartone PT, Johnsen BH, Eid J, Brun W, Laberg JC: Factors influencing small unit cohesion in Norwegian Navy officer cadets. *Milit Psychol* 2002; 14: 1-22.
26. Morgan CA III, Krystal JH, Southwick SM: Toward early pharmacological post-traumatic stress intervention. *Biol Psychiatry* 2003; 53: 834-43.

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